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AUTHOR	Meichtry, Yvonne
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ABSTRACT

This paper presents a study that identifies the needs of environmental education and explores innovative teaching methods in the Northern Kentucky Region. The main focus of this paper is a needs assessment which was conducted by teachers to determine the priority of environmental education programs and the training needs of teachers. Results indicate that teachers found hands-on, interdisciplinary workshops the most useful. Teachers identified the need for environmental education centers as a top priority followed by outdoor education and professional development through training workshops. (YDS)

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An Environmental Education Needs Assessment of K-12 Teachers

[Yvonne Meichtry]

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AN ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT OF K-12 TEACHERS

Yvonne Meichtry, Northern Kentucky University

An environmental education needs assessment of K-12 teachers was conducted as part of a larger project that explored the challenges of preparing Northern Kentucky University (NKU) for the establishment of a regional Center for Environmental Education. The Center at NKU is to be part of a network of Centers located throughout Kentucky. The General Assembly mandated the creation of the Centers in KRS157.915 (3) and, in KRS157.99 (3), establishing the Kentucky Environmental Education Council (KEEC) to help coordinate the activities of this network of Centers. The charge of these Centers is to promote coordination, collaboration, and consistency in the environmental education of university students, elementary and secondary teachers, and the general public (Eller, 1999).

Initial preparations for the establishment of the regional Center at NKU began with a project funded by the Center for Integrative Natural Sciences and Mathematics (CINSAM) at Northern Kentucky University. The goal of this project was to identify current and future needs and to explore innovative methods of enhancing the delivery of environmental education in the Northern Kentucky region. These efforts were aimed at empowering NKU to assume new roles and responsibilities related to the Center for Environmental Education once it was established as part of the state network of Centers.

The activities accomplished by the overall CINSAM project included the following: 1) Identified the needs & programs of formal and non-formal environmental educators in the region; 2) Obtained information from existing Environmental Education (EE) Centers in the state

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about their mission, objectives, and programs; 3) Surveyed the programs of other colleges involved with EE in the region; 4) Investigated existing EE curricula for consistency with state education standards; 5) Explored ways to connect EE with the social science, humanities, economics, and teacher education departments on campus; and 6) Summarized and shared the project findings with the KY Environmental Education Council, university community, and other project participants.

This paper focuses on the results of the needs assessment conducted with teachers as part of Activity 1 identified above. The methodology used to assess teachers' needs is described and the results of the needs assessment are summarized. Follow-up initiatives are then presented. The paper concludes with the implications of this project to environmental educators.

Methodology and Results

The overall purpose of the needs assessment was to determine the priority EE program and training needs of teachers. The assessment methodology consisted of two parts. The first part was a written survey completed by teachers. The design and content of the survey was developed with input from members of the Northern Kentucky Environmental Education Coalition (NKEEC). The NKEEC includes educators from local schools, organizations, and state agencies who are involved in environmental education. Once an analysis of the survey results was completed, a follow-up focus group discussion was conducted to gain additional insights into the teachers' survey responses.

Survey Methods

The survey instrument, presented in the Appendix A, was designed and distributed to 87 teachers. These teachers had been identified as "Contact EE Teachers" for their school buildings.

In this role, they help to distribute mailings and announce EE opportunities for teachers. Of the 51% of teachers who responded, 24 taught at the elementary level, 5 at the middle grades level, and 16 at the secondary level. There were 30 schools represented from 11 districts in 3 counties. The schools were representative of both the public and private sectors.

Survey Results

An analysis of the survey results provided information about what teachers are currently doing, the format of training they would like to see offered, and the level of need they have for various environmental education (EE) program-related services, opportunities, and training.

What Teachers Are Currently Doing

The results, presented in Table 1, indicated that a large majority of teachers are teaching about the environment and environmental issues. There are, however, some who are not. Almost half of the teachers reported having guest speakers, taking field trips, and involving students in action projects. Thirty one percent of the teachers teach in an outdoor setting and 22% have student environmental clubs.

Table 1

Percentage of Teachers Presently Doing Various EE Activities

Percent of Teachers	Teaching Activities
91%	Teach about environmental issues
89%	Teach about the environment
47%	Have guest speakers/programs
44%	Take environmental field trips
42%	Involve students in action projects
31%	Teach in an outdoor setting
22%	Have student environmental clubs

Training Format Desired

As shown in Table 2, the greatest percentage of teachers indicated they would like to see training offered as inservices during the school year. While 49% of the teachers reported wanting summer workshops, only 24 % indicated they would like training offered through university courses for credit. Taking weekend workshops was the least popular choice, with only 20% selecting this type of offering.

Table 2

Training Teachers Would Like to See Offered

Percent of Teachers	Training Format
60%	Teacher inservice during school year
49%	Summer workshops
24%	University courses for credit
20%	Weekend workshops

Level of Program Needs

Teachers were asked to rate the level of need they had for EE services as high, moderate or low. The results, presented in Table 3, revealed that a range of 41%- 91% of teachers rated the 11 services listed as a high level need. The greatest percentage of teachers reported funding as a high level need.

Table 3

Level of Need for EE Services & Opportunities

Program Needs	High need	Moderate Need	Low need
Funding for Activities & Resources	91%	7%	2%
Field Trip Opportunities	83%	12%	5%
Curriculum Resources	74%	21%	5%
Lesson & Curriculum Ideas	70%	25%	5%
Mailings of EE Information	64%	33%	3%
Speakers	63%	33%	5%
Professional Development & EE Training	62%	31%	7%
Development of Teacher Networks	59%	31%	10%
Meetings to Share with Others	51%	28%	21%
Outdoor School Site	50%	29%	21%
Student EE Clubs	41%	34%	24%

Teachers were also asked to priority rank their highest three program needs. As shown in Table 4, the greatest percentage of teachers ranked funding as their number one service need, followed by lesson and curriculum ideas as the second highest need, and field trip opportunities as the third highest need. The point system shown in Table 4 was calculated by assigning a numerical value to the first, second, and third highest need as follows: Highest need = 3 points, 2nd highest need = 2 points, & 3rd highest need = 1 point. These points were assigned to each respondent's ranking for each of the 11 needs listed in the table.

Table 4

Rank Order of Highest 3 EE Service Needs

Program Needs	Overall points	First	Second	Third
Funding for Activities & Resources	53	24%	20%	17%
Lesson & Curriculum Ideas	38	12%	24%	7%
Field Trip Opportunities	33	10%	22%	7%
Curriculum Resources	25	10%	7%	17%
Professional Development & EE Training	22	12%	2%	12%
Speakers	22	10%	10%	5%
Outdoor School Site	19	10%	2%	12%
Mailings of EE Information	6	2%	0%	7%
Meetings to Share with Others	5	2%	0%	5%
Student EE Clubs	3	0%	2%	2%
Development of Teacher Networks	2	0%	2%	0%

Level of Need for EE Training

Table 5 shows the percentages of teachers who rated the level of need they had for EE training. While the greatest percentage of teachers reported training in regard to the availability and use of curriculum to be a high level need, it is evident that teachers would benefit from training in each of the areas listed below. Although training about what EE is was rated as a high level need by the least percentage of teachers, a combined 44% of teachers did rate it as a high or moderate level need.

Table 5

Level of Need for EE Training

Training Needs	High Need	Moderate Need	Low Need
Availability & Use of Curriculum	64%	18%	18%
Technology	59%	24%	17%
Development & Use of Outdoor Sites	58%	20%	20%
Program of Studies Alignment	58%	13%	30%
Teaching Strategies	53%	26%	21%
Funding Sources & Grant Writing	50%	33%	18%
Use of Local Nonformal EE Sites	50%	29%	21%
Integration of EE	50%	28%	23%
Teaching About Environmental Issues	46%	31%	23%
Content Knowledge	28%	36%	36%
What is EE?	13%	31%	56%

Teachers also rank ordered their three priority training needs. As shown in Table 6, the greatest percentage of teachers ranked the development and use of outdoor learning sites as their number one training need, followed by the KY Program of Studies alignment as the second highest need and availability and use of curriculum as the third highest need.

Table 6

Rank Order of Highest 3 EE Training Needs

Training Needs	Overall Points	First	Second	Third
Development & Use of Outdoor Sites	31	18%	11%	5%
Program of Studies Alignment	30	18%	11%	3%
Availability & Use of Curriculum	26	5%	16%	21%
Funding Sources & Grant Writing	24	13%	5%	8%
Content Knowledge	17	11%	3%	8%
Technology	16	8%	5%	8%
Use of Local EE Sites	15	3%	13%	5%
Integration of EE	13	0%	16%	3%
Teaching About Environmental Issues	9	3%	3%	11%
What is EE?	3	3%	0%	0%
Teaching Strategies	2	0%	0%	5%

Comparative Analysis of Grade Level Needs

To determine if there were any differences between the service and training needs of elementary and middle school/secondary teachers, a comparative analysis of the results was done. No significant differences were found.

Focus Group Methods and Results

A 90-minute focus group discussion was conducted to gain more in-depth information about the environmental education needs of teachers that had been assessed by the survey. The seven teachers who participated consisted of two elementary teachers, two middle school teachers, and three high school teachers. Each of these teachers had participated in the survey and had received a written summary of the survey results that had been mailed to all respondents.

The focus group meeting consisted of three parts: 1) Introductions of participants and facilitators followed by a brief overview of the focus group process, 2) Focus group discussions on several questions and 3) Reconvening of the entire group to share results and prioritize needs. There were three focus groups which were designated as elementary, middle school, and high school. Following is a listing of the small group discussion questions and a summary of the results:

1. In what specific ways would funding be helpful to the environmental education efforts of teachers?

Teachers remarked that no school funding has been earmarked for environmental education because it is not a Core Content area on which K-12 students are tested as a part of the state standards assessment program. Instead, interested teachers have had to seek funding from various small grants and have received supplies from businesses such as nurseries and agricultural supply retailers. The teachers reported that a clearinghouse for information on potential funding sources would be a very helpful service.

2A. In what specific ways would field trips be helpful to the EE efforts of teachers?

Low-cost, nearby field trips were especially desirable to the teachers. They reported that summary information about field trips through a web site or newsletter would be a useful service. The teachers strongly advocated sponsoring field trips to different sites on campus led by NKU science education students.

2B. What are the obstacles to taking field trips?

The obstacles reported by teachers centered on transportation issues, time constraints, scheduling within schools, and coordination with other classes. School bus schedules and funding were two constraints related to transportation. Scheduling within schools was more of a problem for departmentalized high schools and middle schools. Students missing other classes due to a field trip posed a problem for both the students and teachers.

3. How would you envision an outdoor site being used at your school for EE?

The teachers believed environmental education sites should provide hands-on learning opportunities to be integrated across all disciplines. They acknowledged that some teachers would probably never use the site, but think most would, if they understood how. Maintenance of the site was recognized as an issue by all of the teachers. It was noted that some volunteer help might be needed to maintain outdoor classrooms.

4A. What are the best ways to recruit teachers to participate in EE opportunities?

The teachers indicated that teachers respond to personal invitations from other teachers or from an institution or organization they respect such as NKU or a county Conservation District. Incentives such as stipends and credit were reported to be desirable. They also reported that free curriculum materials and lesson ideas that can readily be used in their classrooms make new learning opportunities more attractive to teachers.

4B. Describe the nature of professional development that is most useful to teachers.

Hands-on, interdisciplinary workshops were considered to be most useful by the teachers. Professional development that encourages networking with other teachers was also reported to be very desirable.

5. What are some ways you envision a Regional EE Center housed at NKU being most useful to teachers?

Teachers ranked a Regional Center very high on their list of environmental education needs. They indicated that, ideally, such a Center would house nature guides, curricular materials, videos, and other materials that could be loaned to teachers. The loaning of field supplies (e.g. hip waders and nets) for special studies was also a service considered potentially useful by teachers. Having a frequently updated web site with information on field trips, an environmental calendar, and ways for teachers to share ideas was considered a useful function of the Center by the teachers.

The teachers all felt it would be ideal to have an outdoor learning site on the campus of NKU. They envisioned two primary uses of such a site. One use would be a field trip site to which K-12 teachers could bring their students for learning about the environment. Using this site as a lab-school concept, where K-12 students are taught by university students, was an idea greeted with much enthusiasm. The other primary use of this site that teachers expressed a need for related to professional development opportunities for teachers. They stressed the importance of developing the site at NKU to model what teachers can actually do on their own school grounds. They explained that, this way, the outdoor site on campus could serve as a model to train teachers how to develop such a site at their school and how to develop and use curricula in such a site.

At the end of the focus group sharing, the teachers were asked to rank their top three environmental education needs/priorities. Three of the seven teachers rated the establishment of an environmental education center as their top priority. Also ranked high was a land lab/outdoor

classroom at NKU where K-12 students and preservice teachers could learn together, enhancing the education experience for both. Teachers also were very interested in workshops with practical and immediate applications and in methods to integrate book knowledge with outdoor classroom sites. In short, the participating teachers' priorities indicated the need for an expanded role for NKU in environmental education and training.

Follow-Up Initiatives

Although the EE Center in the region had not yet received the funding to be established, the results of this needs assessment were put to immediate use. The results were shared with other environmental educators in the region, resulting in a collaborative effort between university faculty, K-12 teachers, and nonformal environmental educators in the region to plan and conduct an after-school outdoor classroom workshop for teachers. The development and use of outdoor classrooms was selected as the focus of this workshop because of the priority need for such training expressed by teachers in the survey and focus groups interviews. Over 50 teachers attended the workshop. The evaluations of the workshop indicated the high interest of teachers in additional workshops. A reception that will showcase local EE field trip sites and a follow-up, all-day field trip to visit such sites was thus planned.

The development of an outdoor environmental education site on the NKU campus is another recommendation being implemented. The facility being planned will be used to address many of the EE needs of teachers reported in the survey results and will encompass many of the recommendations expressed in the focus group interview. The intention is to develop a site that can be used in the ways recommended by teachers during the focus group interviews; for K-12 student field trips and as a model during professional development activities for developing such

a site and using it as a teaching resource. Preservice teachers and NKU students from other departments, such as Environmental Science and Biology, will be involved in the planning and development of the site. In addition, preservice teachers will have the opportunity to develop and use lessons to teach groups of K-12 student who visit the site during field trips.

The site will facilitate the delivery of the specific types of professional development experiences for which the teachers expressed a need. These experiences include maintenance of an outdoor site, the alignment of EE with the Kentucky Program of Studies, the integration of EE across the curriculum, the integration of book/in-classroom learning with outdoor learning, the availability and use of EE curriculum, and lesson ideas. In addition, the site will offer the context for teacher training which was reported by the teachers to be relevant and practical for their needs and would provide for the type of hands-on instruction that the teachers reported was valued.

In addition to the expressed need of teachers for an outdoor classroom at NKU, the rationale for the development of such a site is based on current research that supports the use of the natural environment as a learning setting. Evidence gathered from 40 schools in a national study conducted by the State Education and Environment Roundtable indicated that students learn more effectively within an environment-based context than within a traditional educational framework (Lieberman & Hoody, 1998). Results from this study showed that when teachers used the natural environment as an educational setting, students had better performance on standardized measures of academic achievement in reading, writing, math, science, and social studies; reduced discipline and classroom management problems; increased engagement and enthusiasm for learning; and a greater pride and ownership in accomplishments. The results of the study also indicated positive outcomes for teachers. These outcomes included greater

enthusiasm and engagement, greater use of interdisciplinary approaches, greater collaboration with other teachers, and an increased willingness to use new teaching methods.

Funding was a great need of teachers according to both the survey and focus group results. Funding sources such as existing state grant programs, federal programs, private foundations, and local businesses will be sought for the purpose of developing the outdoor site on campus and acquiring curriculum, technology, and equipment resources to enhance instruction at the site. Using external funds in such a way will, again, serve as a model for teachers in regard to how they can acquire such funding. The identification of funding sources and insights about successful fundraising are planned as topics to be incorporated into professional development experiences for teachers.

Implications

Some caution should be exercised when generalizing the results of this study to other populations. The teachers in this study all served as EE Contact Teachers for their school. The EE Contact teachers have expressed an interest in EE and have agreed to distribute information about EE to other teachers in the school. This sample thus represents a population of teachers who have an inherent interest in EE and who are more likely to have skills and knowledge about teaching EE than the general population of teachers. Given that a high percentage of teachers in this study have either a high or moderate level need for each of the eleven areas of program and training needs listed on the survey, it might be assumed that teachers in a more generalized population of teachers would express an even higher level of need.

One major implication of the results of this project is that a great percentage of teachers have either a high or moderate level of need for each of the eleven areas of training listed on the

survey. The priority program needs of teachers to be addressed by environmental educators, as evidenced by the results of this assessment, included funding opportunities, lesson and curriculum ideas, and field trip opportunities. Priority professional development needs were evident in the areas of outdoor education site development and use, the use and alignment of EE curriculum with state standards, and the availability and use of curriculum resources. The two preferred formats for professional development experiences were inservice presentations during the school year and workshops. A smaller percentage of teachers expressed interest in university courses and weekend workshops.

Both formal and nonformal environmental educators can use such results from needs assessments in the planning of professional development opportunities for teachers. In addition to planning professional development workshops, such results can be used by university teacher education faculty to design formal coursework and EE programs for inservice teachers.

In addition to helping to identify and address the priority needs of teachers, this project can benefit others by serving as a model in regard to needs assessment methodology and use. The combined methodology of the survey and follow-up focus groups is a process that yields useful information for a variety of purposes and populations.

This project also serves as a model for the collaborative design and use of a needs assessment for teachers. Collaborative participants in this project were members of the Northern Kentucky Environmental Education Coalition, which is represented by the County Conservation Districts, Cooperative Extension Service, Environmental Resource Management Center at NKU, regional and local parks personnel, K-12 teachers, and university faculty. Environmental educators from each of these affiliations provided input into the design and content of the survey,

helped to distribute the results, and assisted with planning and conducting initiatives to implement the results.

Conclusion

This project can serve as a model for conducting EE needs assessments with a variety of populations in a number of different settings. Populations other than K-12 teachers to be considered include pre-service teachers, pre-school teachers, university faculty in teacher education and other university departments involved in environmental education, postsecondary students, local service groups that desire to be more proactive in the stewardship of the environment, and the general public. A needs assessment might also be considered in a number of different settings, ranging from more localized settings such as a single school district or school to a statewide setting. While a local setting would allow for specific needs to be identified and addressed at the local level, a statewide assessment could be analyzed by region, taking into account demographic factors which have an impact on the planning and offering of environmental education opportunities.

An increasing number of states are aligning state standards in a variety of subject areas with NAAEE's *Guidelines for Learning K-12* (1999). As teachers prepare to address the *Guidelines for Learning K-12* and teacher educators prepare to implement the *Guidelines for the Initial Preparation of Environmental Educators* (1999), studies such as this needs assessment will prove to be increasingly valuable.

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Appendix A

Needs Assessment
How Could a Region 4 Environmental Education Center Meet Your Needs?

Name of District and School

_____

Grade Level(s) Taught _____

Subject Area(s) Taught

_____

Presently Do at My School

___ Teach about the environment

___ Teach about environmental issues

___ Involve students in action projects

___ Teach in an outdoor setting

___ Take environmental field trips

___ Have guest speakers/programs

___ Have student environmental clubs

Other _____

Training Would Like to See Offered

___ Teacher inservice during school year

___ Weekend workshops

___ Summer workshops

___ University courses for credit

___ Other _____

Are you a member of *Kentucky Association for Environmental Education?* Yes No

Have you ever attended a *KAEE* Conference? Yes No

ENVIRONMENTAL EDUCATION NEEDS

EE Services: Please rate your level of need for EE services, using the scale below:

	Low	Moderate			High
1. Outdoor school site	1	2	3	4	5
2. EE professional development & training	1	2	3	4	5
3. Funding for activities and resources	1	2	3	4	5
4. Mailings regarding EE information & opportunities	1	2	3	4	5
5. Curriculum resources	1	2	3	4	5
6. Field trip opportunities	1	2	3	4	5
7. Meetings to share, network, and learn	1	2	3	4	5

8. Lesson plan and curriculum ideas	1	2	3	4	5
9. Speakers	1	2	3	4	5
10. Student clubs	1	2	3	4	5
12. Development of teacher networks	1	2	3	4	5
13. Other _____	1	2	3	4	5

Please rank order your top three service needs, with 1 being your highest need, 2 your second highest need, and 3 your third highest need:

1. 2. 3.

EE Training Needs: Please rate your level of need for EE training in the following areas, using the scale below:

	Low		Moderate		High
1. What is environmental education?	1	2	3	4	5
2. Content knowledge about the environment	1	2	3	4	5
3. EE teaching strategies	1	2	3	4	5
4. Availability & use of curriculum resources	1	2	3	4	5
5. Integrating EE with other subjects	1	2	3	4	5
6. Teaching about environmental issues	1	2	3	4	5
7. Alignment of EE with Program of Studies (Core Content)	1	2	3	4	5
8. Technology use relating to EE	1	2	3	4	5
9. Development & use of outdoor EE site	1	2	3	4	5
10. Funding sources & grant writing skills	1	2	3	4	5
11. Use of local nonformal EE sites	1	2	3	4	5
12. Other _____	1	2	3	4	5

Please rank order your top three training needs, with 1 being your highest need, 2 your second highest need, and 3 your third highest need:

1. 2. 3.

Please comment in any way you think would be helpful for purposes of this survey:

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